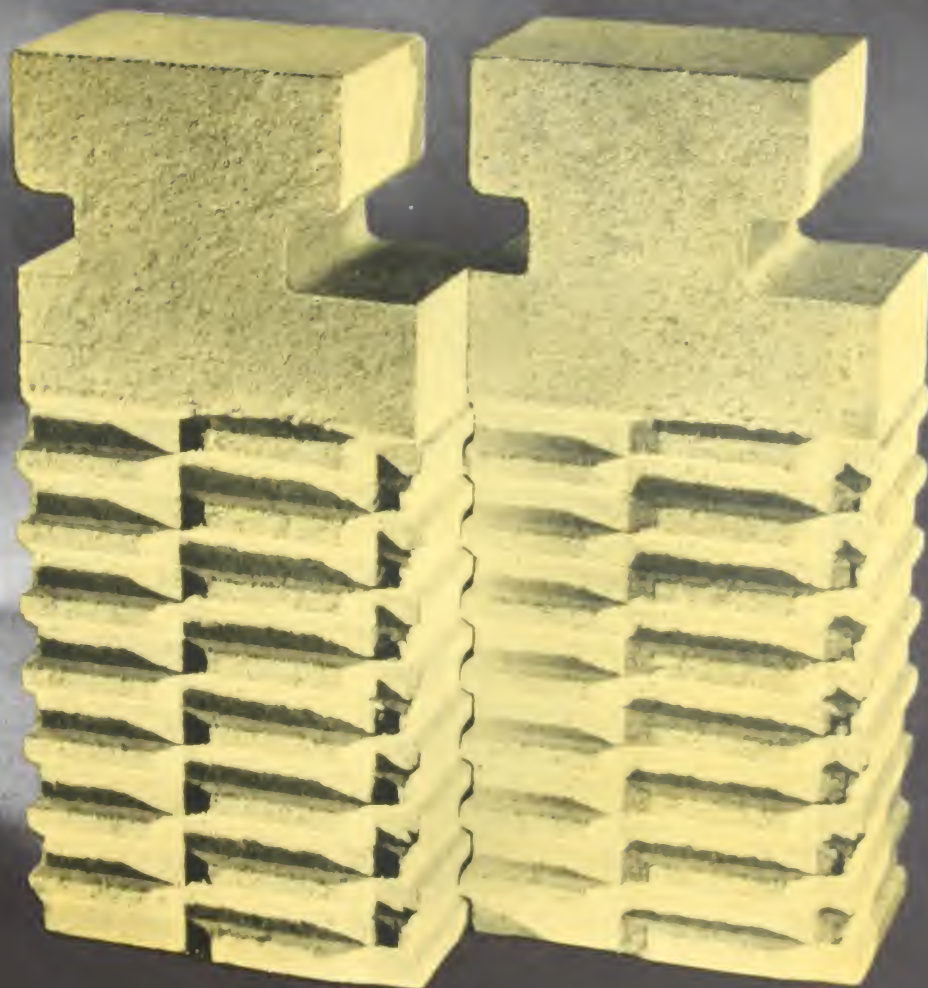


1368-4

# DETRED



*The  
New Arch and Wall  
Construction with the*  
**DETRICK TREAD**

NOV 25 1942

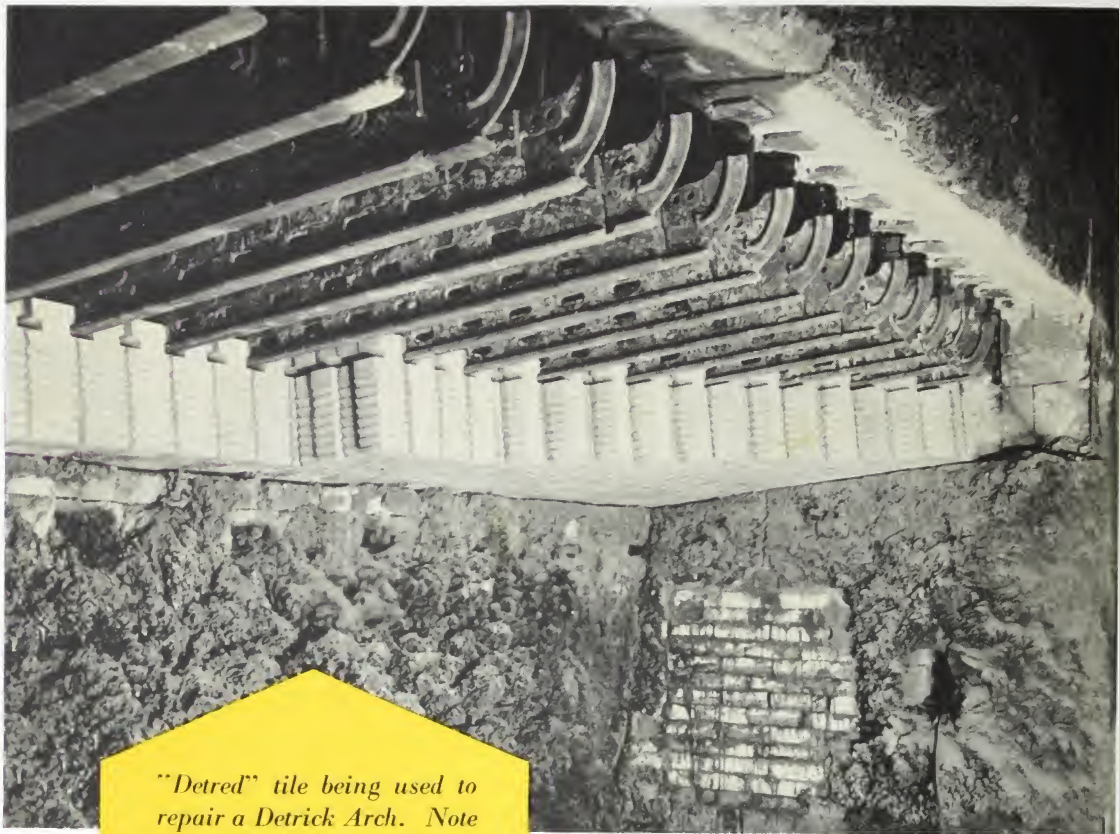
**M. H. DETRICK COMPANY**

CHICAGO

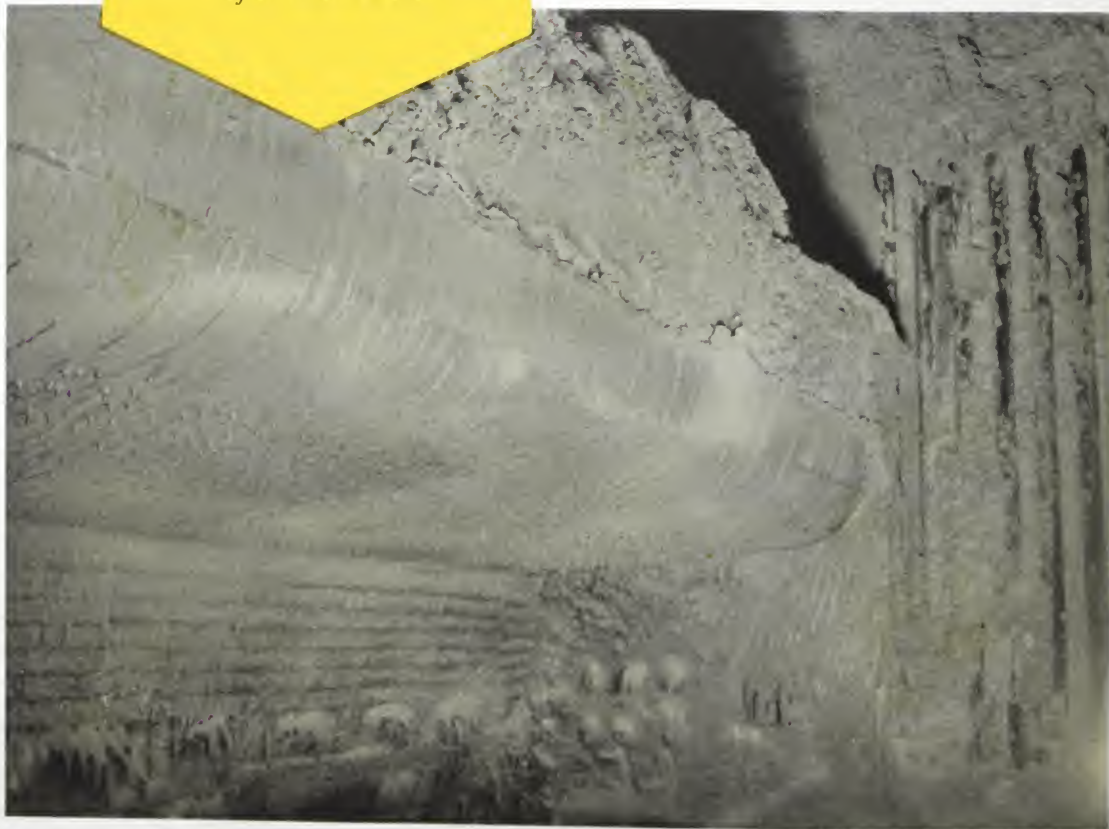
1616 Walnut St. Bldg. - Philadelphia, Pa.

**FI**





"Detred" tile being used to repair a Detrick Arch. Note how easy it is to install the tile. Below is the same arch after severe service.





# DETRICK DETRED CONSTRUCTION

Detrick "Detred" Arch and Wall construction is a distinct departure from anything that has been offered previously and is a new and superior type of suspended furnace construction.

The "Detred" tile are approximately one-half the size of those formerly used in Detrick construction and the faces of the tile are covered with corrugations or treads, which mesh together with those on adjacent tile. The corrugations are so designed that the longitudinal joints in an arch and the vertical joints in a wall can be straight or offset.

By the use of these tile a number of advantages

are obtained, directly affecting the maintenance costs and life of arch and wall installations. These advantages are as follows:

The faces of all the tile are intermeshed; therefore, any pieces that may become loose due to cracking or spalling will be held in place. The small size and the frequency of the Detrick

tread has proven very effective in actual service in holding spalls in place even when they are quite small.

The "Detred" tile are approximately one-half the size of the standard T-slotted tile shapes. This facilitates the construction work, as the smaller tile can be handled in one hand, whereas the larger tile had to be handled in two hands. The reduced size permits easier and more accurate manufacture.

It permits a more uniform burning through

the interior of the tile so that there is less danger from spalling or cracking as a result of strains set up in the tile during manufacture.

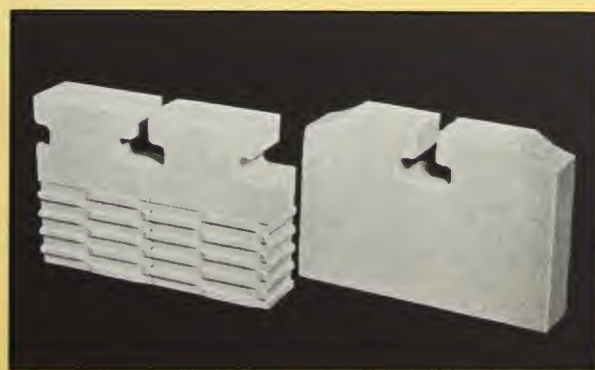
All joints between the tile are treaded. This



"Detred" Tile have corrugations or tread on four faces.



The vertical or longitudinal joints are staggered.



The "Detred" Tile are approximately one-half the size of standard tile.

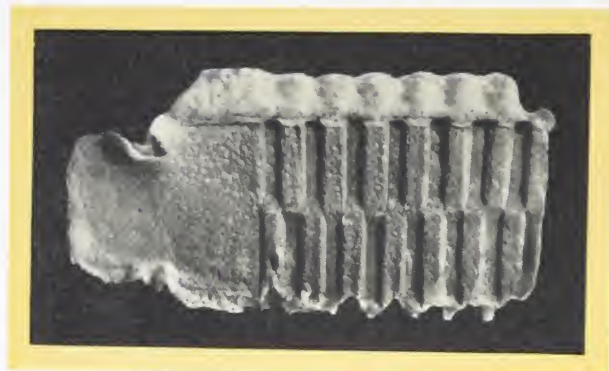


The faces are intermeshed so that spalls that occur cannot fall out.

ID 89-87363 TCF



eliminates any possibility of gases or flames working through the joints, and prevents air from leaking into the furnace. Instead of a flat sheet of fire clay or joint material that forms



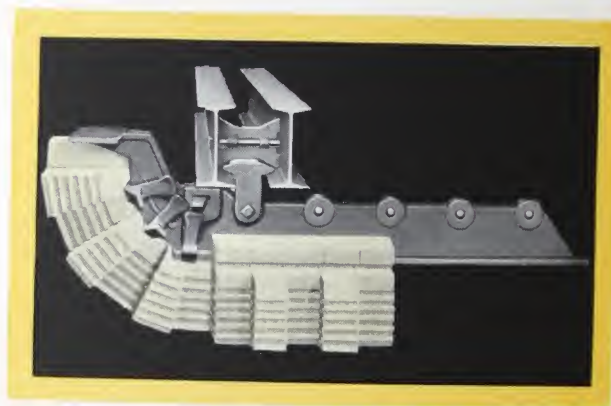
*The joints in the "Detred" construction take the form of a "waffle"  $\frac{1}{32}$ " to  $\frac{1}{16}$ " thick.*

the joint in a standard arch or wall, the joint in the Detrick "Detred" construction takes the form of a "waffle". The intermeshing corrugations on the adjoining tile form the "waffle irons" and the joint material is so locked in place between them that it cannot come loose or fall out. This is important, both from the standpoint of being an expansion cushion and from the standpoint of air leakage.

The tile are so designed that they will fit the castings of existing Detrick Arches and Walls. Complete repair of an arch or a wall can be made, in most cases, with the improved tile, without additional castings or changing the construction in any way. In making only a partial repair to an arch or a wall it would be necessary to cut some of the "Detred" tile to

fit the old construction on account of the offset joints and eccentricity of the tile. Present Detrick users are urged to use the "Detred" tile for their next repair. Complete instructions will be furnished to cover the details of the installation of the material for the particular layout involved.

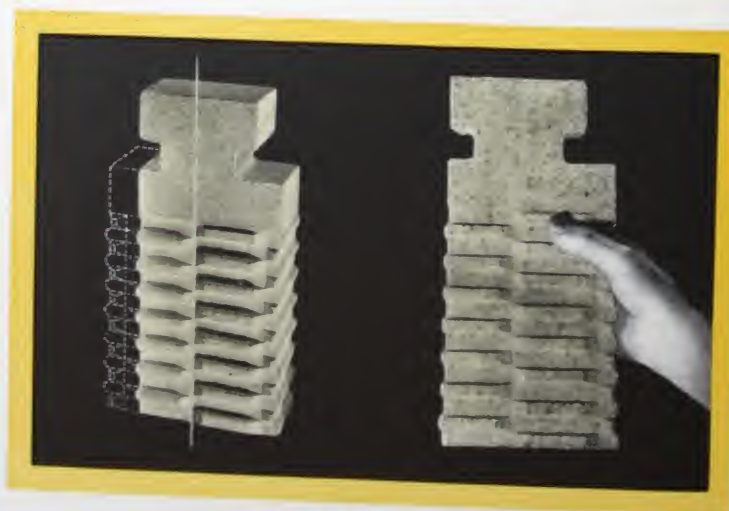
Special consideration has been given to keeping the number of special shapes to a minimum. By the use of "Detred" tile for both walls and arches, it is possible for some designs to have a maximum of two shapes in an arch and not to exceed four shapes in a wall. Two of the four shapes in the wall are for the offset



*"Detred" Tile may be used to repair existing Detrick installations without casting renewals.*

expansion joint. These are nothing more than a standard tile cut in two pieces. In the average wall and arch job 90% of the arch will be one shape of tile, and 85% of the wall will be one shape of tile.

*Tile have been designed eccentrically so that 80% to 90% of the arch or wall is made up of one shape of tile.*



*Small size tile which can be handled as shown, makes the construction easier to install and repair.*



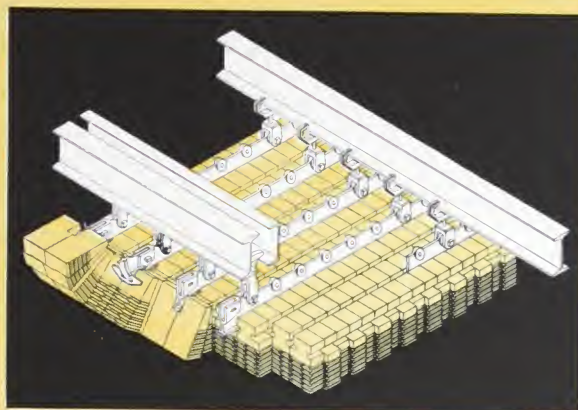
# DETRICK DETRED ARCH

In the assembly of the Detrick "Detred" Arch, the tile are installed in exactly the same fashion as the standard T-slotted tile, except that alternate rows have the name plates faced, first forward and then backward, in order to effect the staggering of the joints. The radial tile is also arranged for staggered joints.

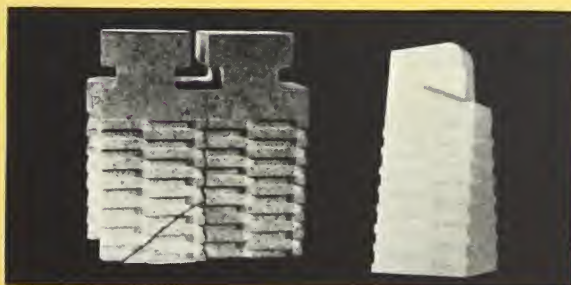
Detrick "Detred" Arches can be designed to suit any furnace condition and shaped to the desired contour necessary for the proper furnace design. The same substantial supporting structure used in thousands of Detrick Arch installations is utilized. In addition the "Detred" tile provides many new features. The breaking away of pieces of the tile due to spalling or cracking is entirely eliminated. The joints

between the tile remain intact, eliminating air infiltration or gas leakage through the arch. These advantages have a direct bearing on arch maintenance cost. By the use of "Detred" tile the arch life will be greatly increased.

"Detred" radial tile are of approximately the same size as the straight arch tile. They have



*"Detred" Arch Construction is applied to standard Detrick castings. Note staggered joints.*

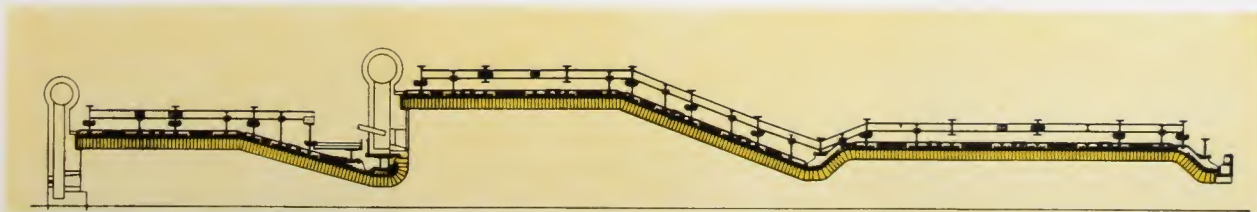


*(Left) Spalling usually takes place at the corners first. The treads prevent pieces from falling out. (Right) Detail of radial tile.*

corrugations on three sides and fit the radial castings of existing installations. The face of the tile, which is exposed to the fire, is approximately half of that in the former construction and thereby decreases the possibility of spalling on the radial end. Any small spalls which do occur are retained by the treaded faces and the staggered joints.

"Detred" Arches may be used with as much as 4" of insulation, and still withstand furnace temperatures ordinarily encountered. In all cases the supporting casting projects out of the insulation sufficiently to radiate enough heat so that the flange which

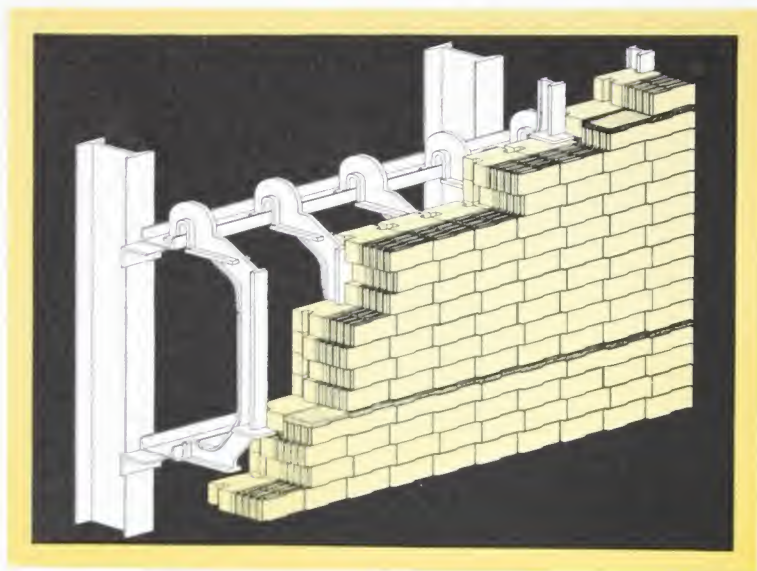
supports the tile is maintained at a safe temperature. Detrick Insulated Arches have been in satisfactory operation for more than ten years.



*"Detred" Insulated Arch Construction applied to a steel mill continuous heating furnace.*



# AIR COOLED DETRED WALL



*Staggered joints reduce slagging; treads reduce spalling and air leakage.*

The "Detred" construction is applicable either to the air cooled construction or to the insulated wall construction.

From the structural framework vertical castings are hung, spaced at approximately 12½" horizontally. Each vertical casting is provided with a shelf which forms the support-

ing base for the vertical row of tile. Between each vertical section of tile, these sections varying from 2 ft. to 3 ft. in height, an expansion joint is provided. All tile are intermeshed on all four sides with adjacent tile. On the furnace side of the tile all vertical joints are staggered.

"Detred" tile offers many advantages in suspended wall construction. All joints are sealed providing an air and gas tight wall. In walls that are quite wide, the flexibility of the castings allows the sections to expand outwardly without setting up strains in the tile. In cooling down, the over-lapping joints and the intermeshing tread assist greatly in bringing the wall to approximately its former position without opening vertical joints which may fill up with slag or dust before expansion again takes place.

The tread on the four sides of the tile prevents flame or furnace gases from being forced thru the tile into the air lane under plus pressure conditions and prevents air from leaking from the air lane into the furnace under draft conditions. Even the horizontal expansion joints are offset to prevent the possibility of air or gas leakage. The vertical joints are staggered. This is very beneficial in preventing slag which runs down the wall from cutting out the joints.



The number of tile shapes is kept to a minimum. For most wall installations four shapes are used, but actually the wall could be built from one shape inasmuch as the expansion joint tile and the wider tile which finishes and squares off the end of the wall are simply variations of the standard tile.

*The "Detred" Expansion Joint is a slip joint.*

*One standard tile and two expansion joint tile make up the wall.*





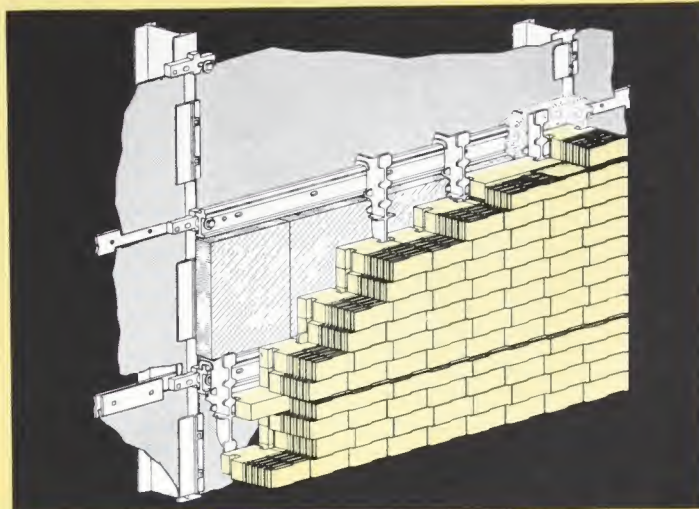
# INSULATED DETRED WALL

In the "Detred" Insulated Wall, cast iron horizontal supports are first fastened to the vertical columns at 2'-0" or 3'-0" centers. Vertical castings are then simply hung from these horizontal bars. Each vertical casting is provided with a shelf which acts as a base for the bottom tile in each vertical section. These bottom, or shelf tile, are then installed in place between the vertical hangers and the balance of the tile in the section installed on and above the shelf tile. Between the vertical sections an expansion joint is installed, which is of the slip joint type, to prevent air or flame leakage.

"Detred" tile offers many advantages in an Insulated Wall. It is of vital importance to keep this type of wall as tight as possible. All joints are sealed, providing a gas tight wall. All vertical joints are staggered and all horizontal expansion joints are offset. Special consideration has been given to the design of the castings for Detrick "Detred" Insulated Walls, in order to keep the heat input to the castings at a minimum. The inherent features of the

"Detred" tile, together with the design of the castings, tend to keep the heat loss thru a Detrick "Detred" Insulated Wall at a minimum.

Spalling is just as liable to occur in insulated walls as in air cooled walls, even when the temperatures encountered may be quite low. At low temperatures the spalling usually



*The "Detred" Design makes it possible to tie in every tile minimum of hangers.*

occurs for mechanical reasons, altho thermal shocks do occur. The small size of the "Detred" tile, the intermeshing of the tread on the four faces of the tile, and the staggering of the joints, are all of great importance in preventing spalling in the "Detred" construction.

The "Detred" insulated wall design lends itself to the use of block or loose insulation. The insulated type wall can also be used as an air cooled wall where the space

available for the wall is limited.

Repairs to Detrick "Detred" Air Cooled and Insulated Walls can be made from either the inside or the outside of the furnace. Each section is available for repair without disturbing any other section.



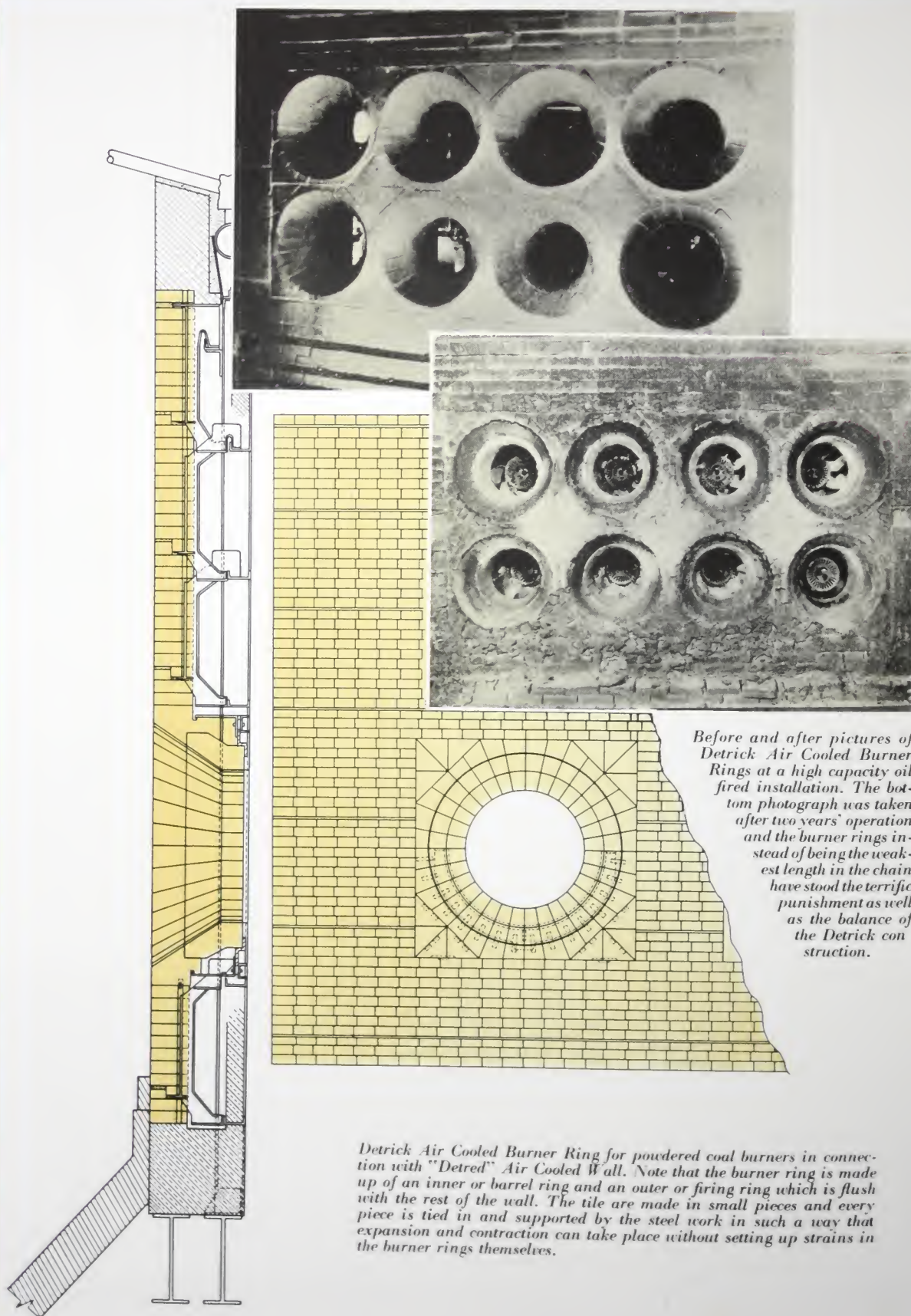
*Block, plastic or loose insulation and casing can easily be applied.*



*The insulated type wall can be used as air cooled wall when space is limited.*



## Detrick "DETRED" Construction

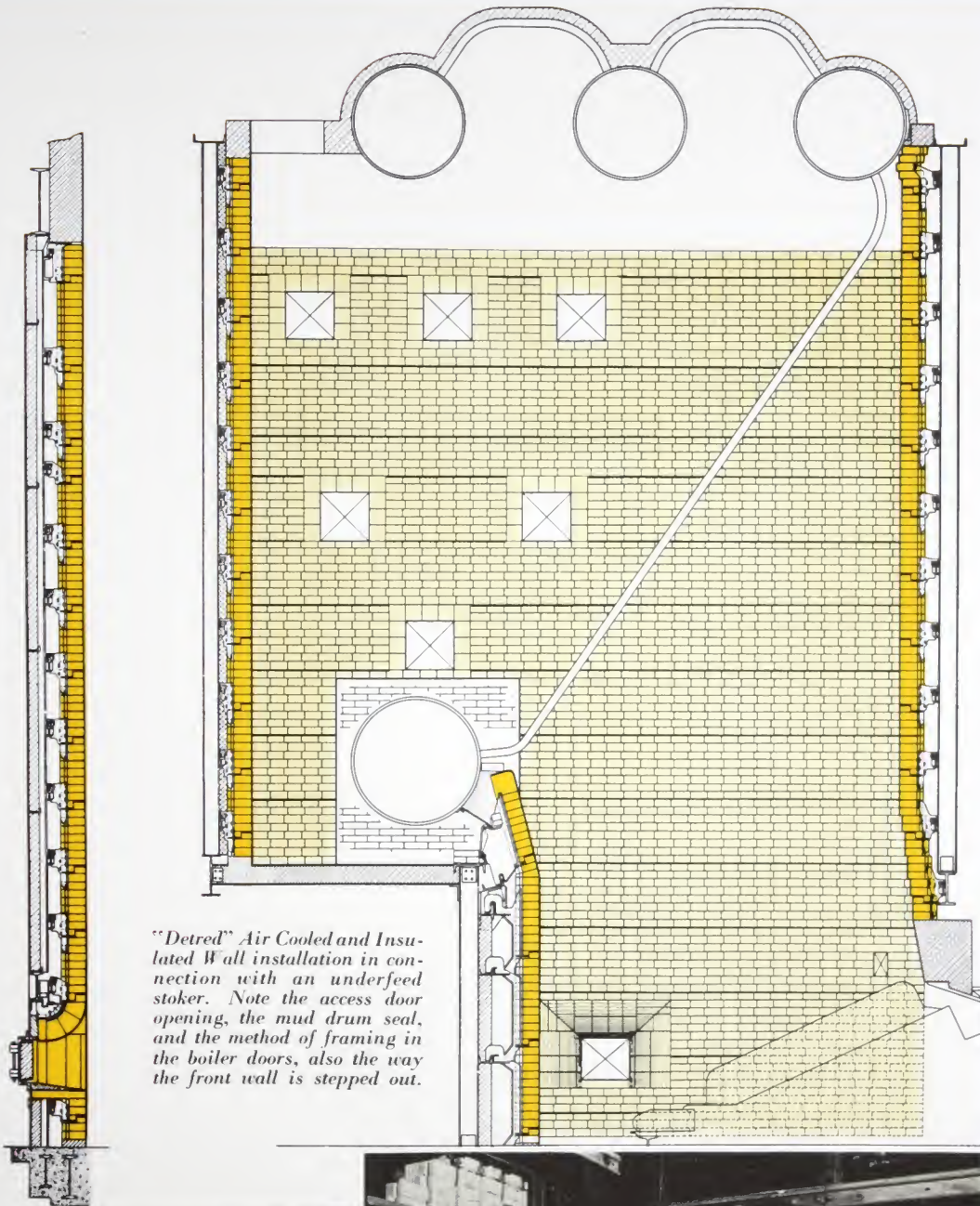


Before and after pictures of Detrick Air Cooled Burner Rings at a high capacity oil fired installation. The bottom photograph was taken after two years' operation and the burner rings instead of being the weakest length in the chain have stood the terrific punishment as well as the balance of the Detrick construction.

Detrick Air Cooled Burner Ring for powdered coal burners in connection with "Detred" Air Cooled Wall. Note that the burner ring is made up of an inner or barrel ring and an outer or firing ring which is flush with the rest of the wall. The tile are made in small pieces and every piece is tied in and supported by the steel work in such a way that expansion and contraction can take place without setting up strains in the burner rings themselves.



# Detrick "DETRED" Construction

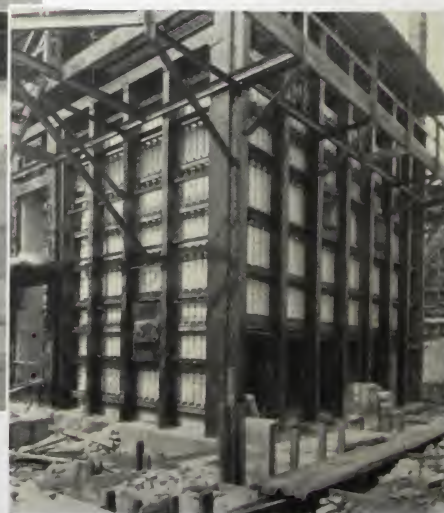
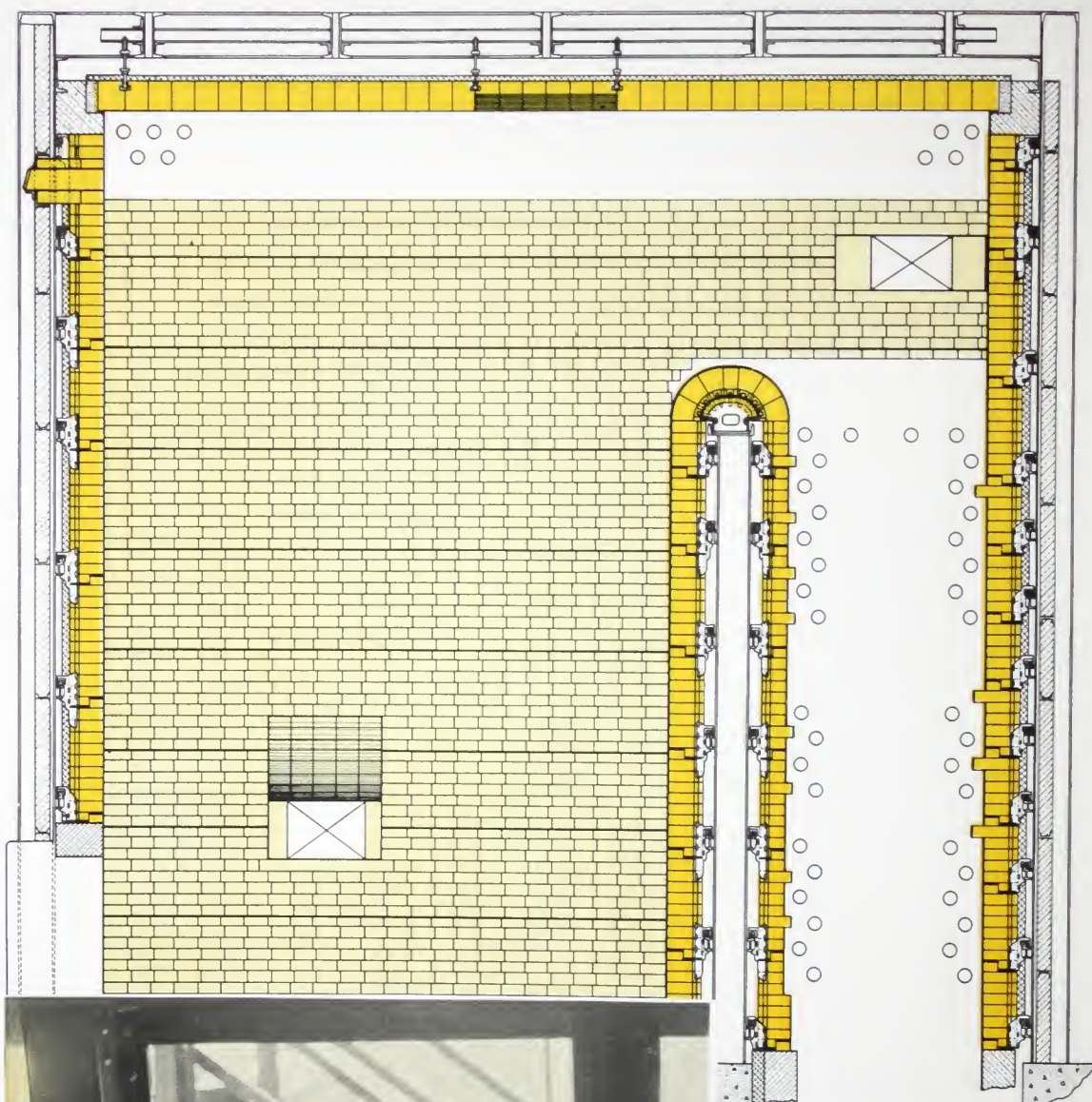


*"Detred" Air Cooled and Insulated Wall installation in connection with an underfeed stoker. Note the access door opening, the mud drum seal, and the method of framing in the boiler doors, also the way the front wall is stepped out.*





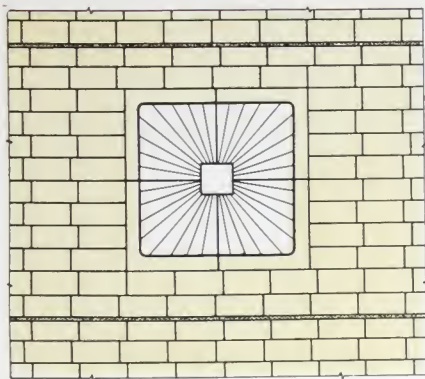
# Detrick "DETRED" Construction



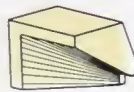
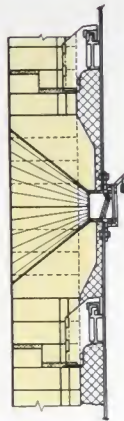
"Detred" Insulated Wall and Arch on an oil still furnace. The solid refractory wall on this furnace had failed. Detrick Walls have been in operation on stills for ten years without repair. The "Detred" design offers new advantages in air tightness, no spalling, safety with insulation and thinner refractory.



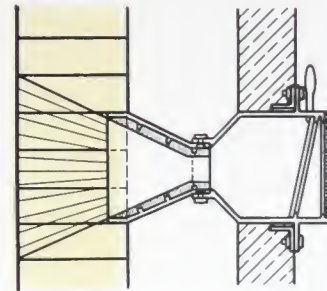
# STANDARD DOORS FOR "DETRED" WALLS



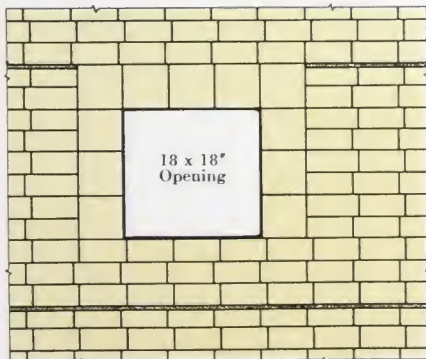
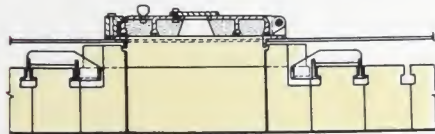
Standard peep door tile for the insulated wall fill a space 18" x 18" or 24" x 24" with the outside opening 4" x 4".



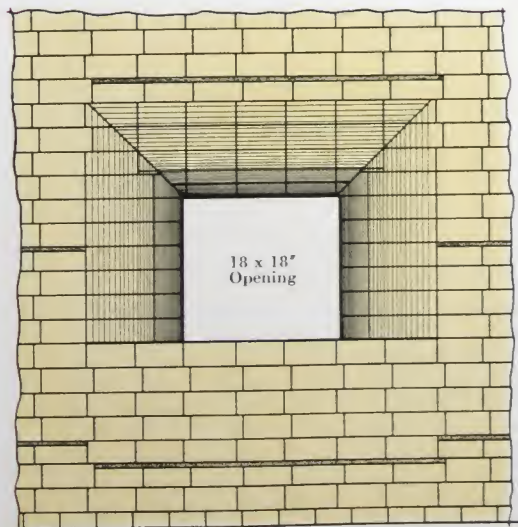
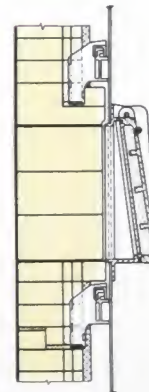
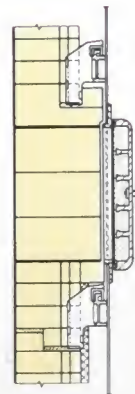
Peep door tile.



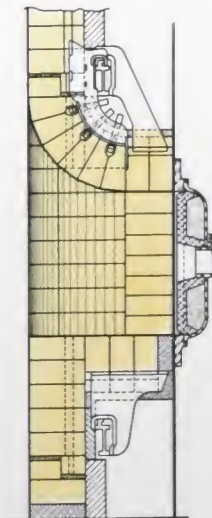
Standard plastic lined observation doors for the air cooled wall fit an opening in the tile 9" x 12" or 9" x 6" and have an outside opening 9" x 9" or 9" x 4 1/2".



Standard access and explosion door openings for the insulated wall are 12" x 12", 18" x 18", 24" x 24" and 30" x 30". Standard door tile that close off the opening, and insulation space side are supported by castings.

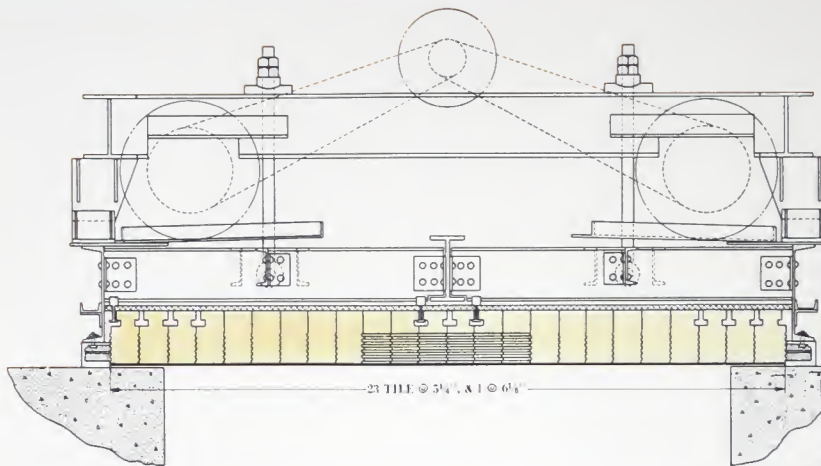


Combination access and inspection door with radial tile top and sides. This type of door requires a wall at least 14" thick.





# Detrick "DETRED" Construction



10" deep "Detred" tile applied to soaking pit cover. The inter-meshing of the joints is of great benefit in this service.

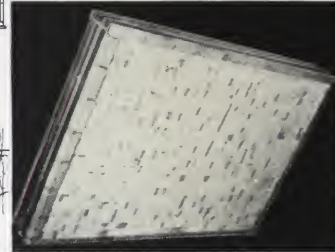
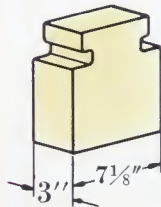
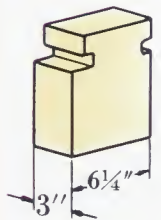


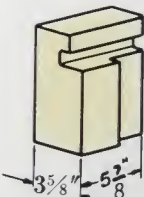
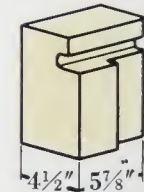
TABLE OF 7" AND 9" "DETRED" TILE WIDTHS



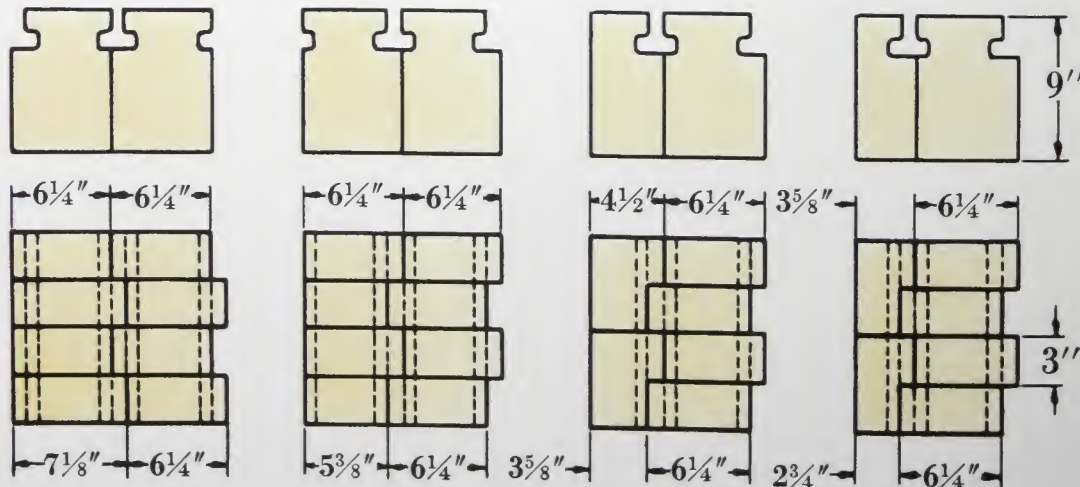
Standard  
"Detred"  
Tile

Tile Wth.	2 @ 7 1/8"	1 @ 5 3/8" 1 @ 7 1/8"	2 @ 5 3/8"	1 @ 7 1/8" 1 @ 4 1/2"	1 @ 3 5/8" 1 @ 4 1/2"	1 @ 2 3/4" 1 @ 3 5/8"	1 @ 4 1/2" 1 @ 3 5/8"
4	2' 1 7/8"	2' 1"	2' 0 1/8"	1' 11 1/4"	1' 10 3/8"	1' 9 1/2"	1' 8 5/8"
5	2' 8 1/8"	2' 7 1/4"	2' 6 3/8"	2' 5 1/2"	2' 4 5/8"	2' 3 3/4"	2' 2 7/8"
6	3' 2 3/8"	3' 1 1/2"	3' 0 5/8"	2' 11 3/4"	2' 10 7/8"	2' 10"	2' 9 1/8"
7	3' 8 5/8"	3' 7 3/4"	3' 6 7/8"	3' 6"	3' 5 1/8"	3' 4 1/4"	3' 3 3/8"
8	4' 2 7/8"	4' 2"	4' 1 1/8"	4' 0 1/4"	3' 11 3/8"	3' 10 1/2"	3' 9 5/8"
9	4' 9 1/8"	4' 8 1/4"	4' 7 3/8"	4' 6 1/2"	4' 5 5/8"	4' 4 3/4"	4' 3 7/8"
10	5' 3 3/8"	5' 2 1/2"	5' 1 5/8"	5' 0 3/4"	4' 11 7/8"	4' 11"	4' 10 1/8"
11	5' 9 5/8"	5' 8 3/4"	5' 7 7/8"	5' 7"	5' 6 1/8"	5' 5 1/4"	5' 4 3/8"
12	6' 3 7/8"	6' 3"	6' 2 1/8"	6' 1 1/4"	6' 0 3/8"	5' 11 1/2"	5' 10 5/8"
13	6' 10 1/8"	6' 9 1/4"	6' 8 3/8"	6' 7 1/2"	6' 6 5/8"	6' 5 3/4"	6' 4 7/8"
14	7' 4 3/8"	7' 3 1/2"	7' 2 5/8"	7' 1 3/4"	7' 0 7/8"	7' 0"	6' 11 1/8"
15	7' 10 5/8"	7' 9 3/4"	7' 8 7/8"	7' 8"	7' 7 1/8"	7' 6 1/4"	7' 5 3/8"
16	8' 4 1/8"	8' 4"	8' 3 1/8"	8' 2 1/4"	8' 1 3/8"	8' 0 1/2"	7' 11 5/8"
17	8' 11 1/8"	8' 10 1/4"	8' 9 3/8"	8' 8 1/2"	8' 7 5/8"	8' 6 3/4"	8' 5 7/8"
18	9' 5 3/8"	9' 4 1/2"	9' 3 5/8"	9' 2 3/4"	9' 1 7/8"	9' 1"	9' 0 1/8"
19	9' 11 5/8"	9' 10 3/4"	9' 9 7/8"	9' 9"	9' 8 1/8"	9' 7 1/4"	9' 6 3/8"
20	10' 5 1/8"	10' 5"	10' 4 1/8"	10' 3 1/4"	10' 2 3/8"	10' 1 1/2"	10' 0 5/8"

Note: 10" and 12" "Detred" widths are worked out with combinations of 5 1/4" standard tile, 6 1/8" and 4 3/8" finish tile and 2 1/8" x 3" "L" tile.

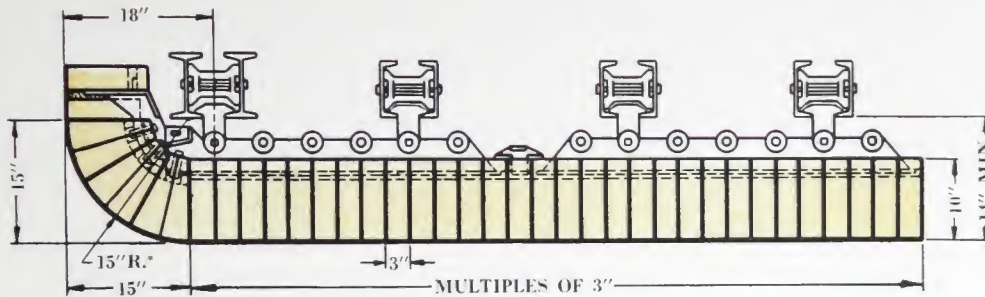


Special  
Finish  
Tile

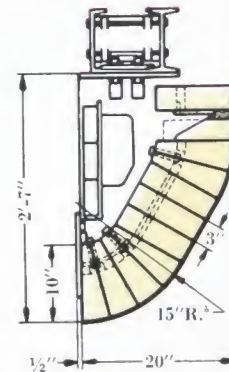
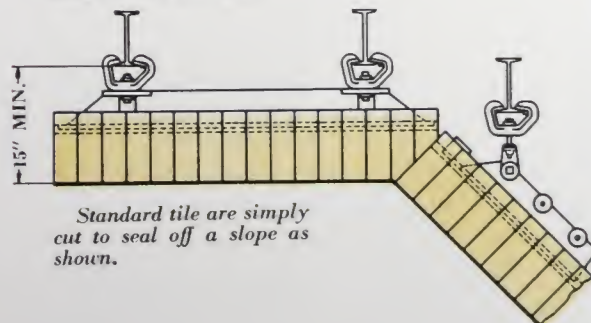
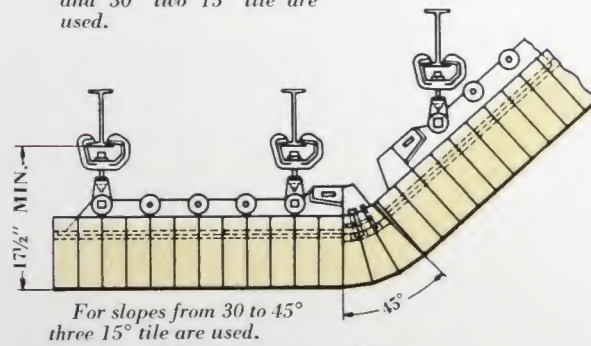
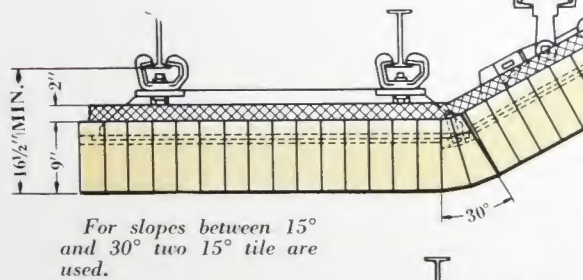
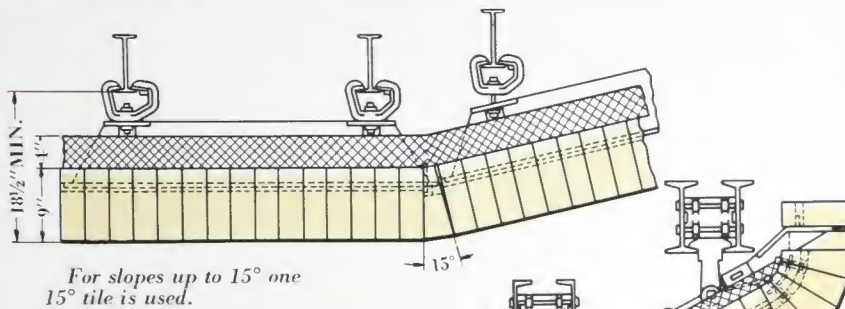




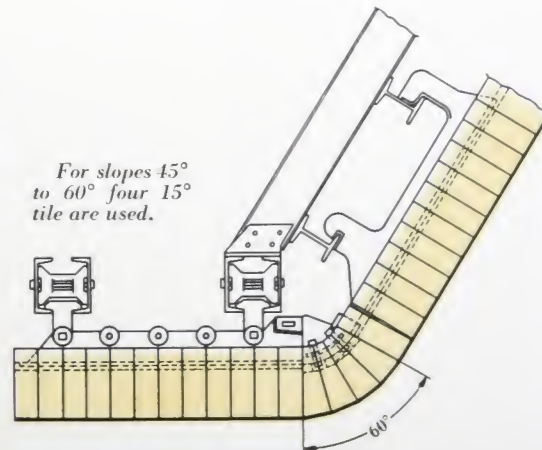
# STANDARD "DETRED" ARCH DETAILS



Standard "Detred" pitches are in increments of 15°. Intermediate angles are taken care of as shown.



Standard Ignition Arch

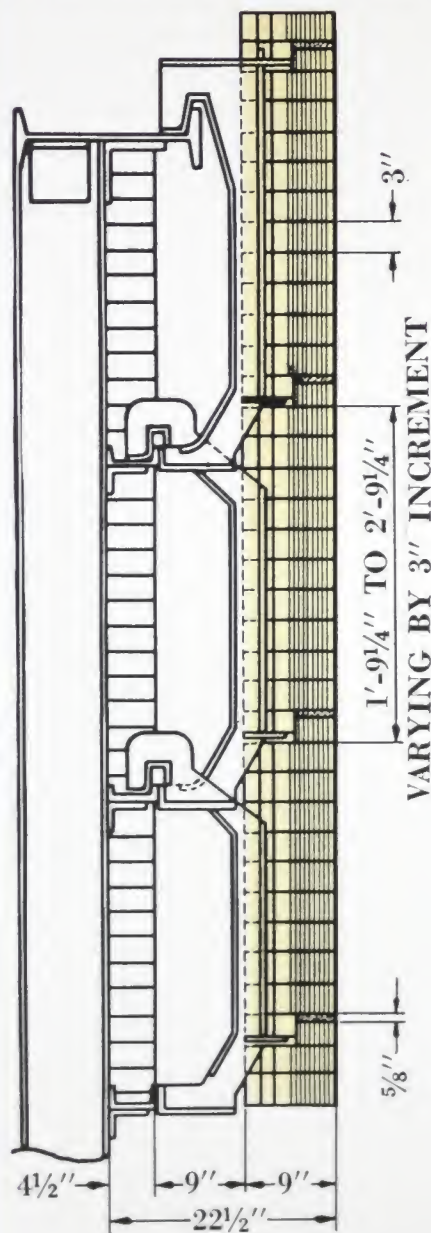


NOTE: \*

Radius for 12" radial tile—17"  
10" radial tile—15"  
9" radial tile—14"  
7" radial tile—12"



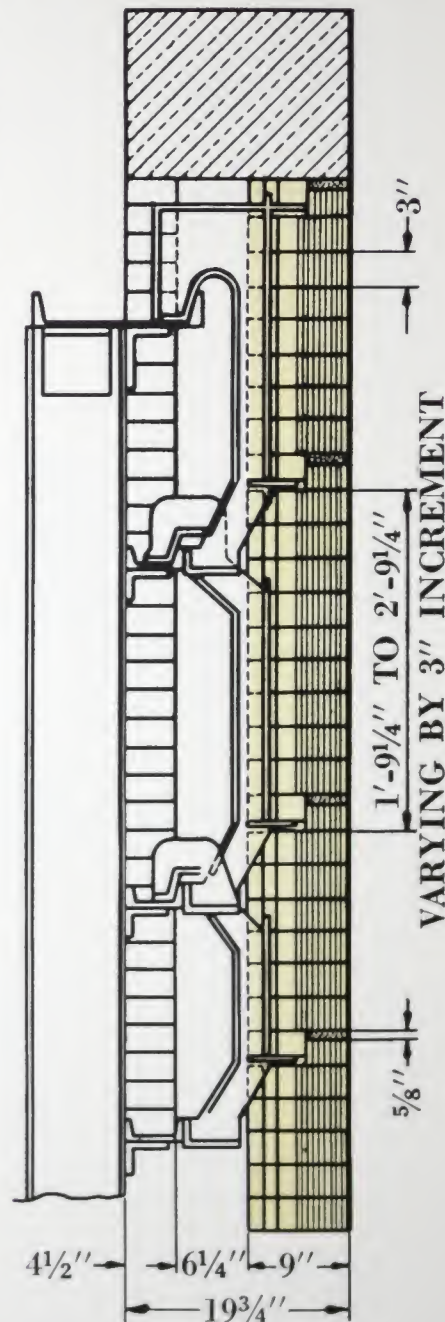
# STANDARD "DETRED" AIR COOLED WALL DETAILS



These two Detred wall thicknesses are most commonly used for boiler furnace work. The 6 1/4" air space may be used for moderate quantities of circulating air, and the 9" air space when larger volumes must be circulated. Note that the wall thicknesses of 22 1/2" and 19 3/4" are exclusive of the vertical structural steel columns, altho the columns can be included within these dimensions if necessary.



Air cooled wall casting.

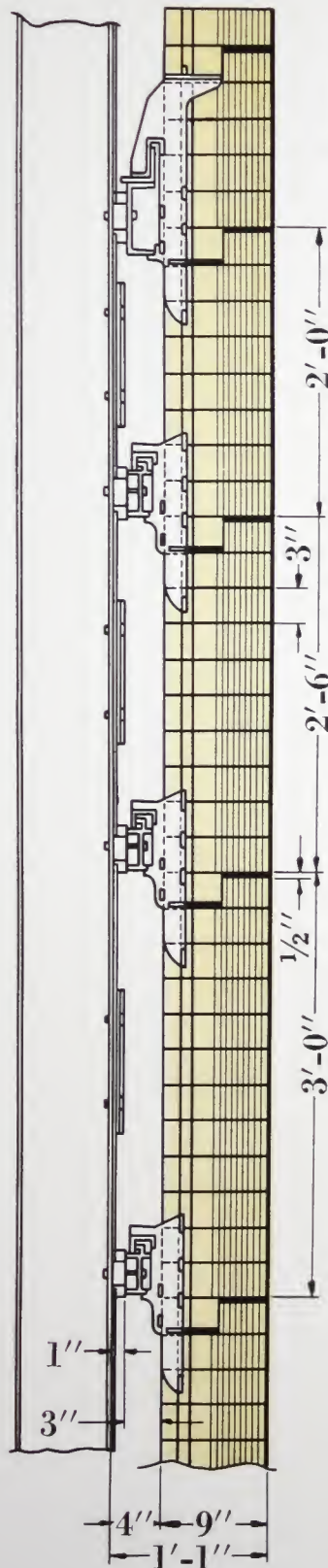


Detrick Damper for air flow control.





# STANDARD "DETRED" INSULATED WALL DETAILS



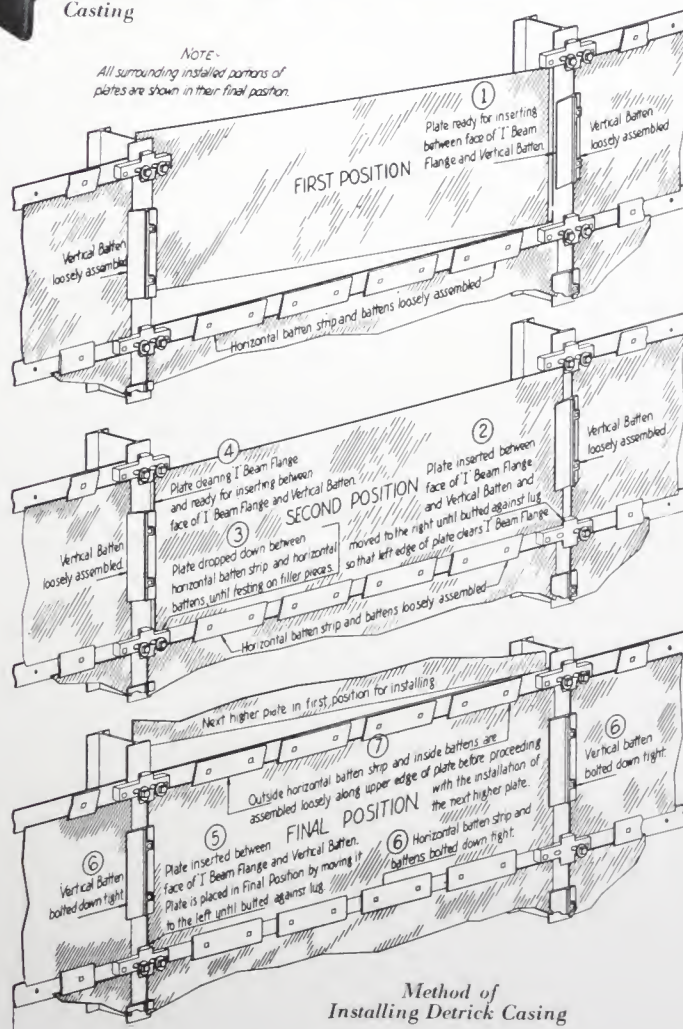
Vertical Casting



Horizontal Casting

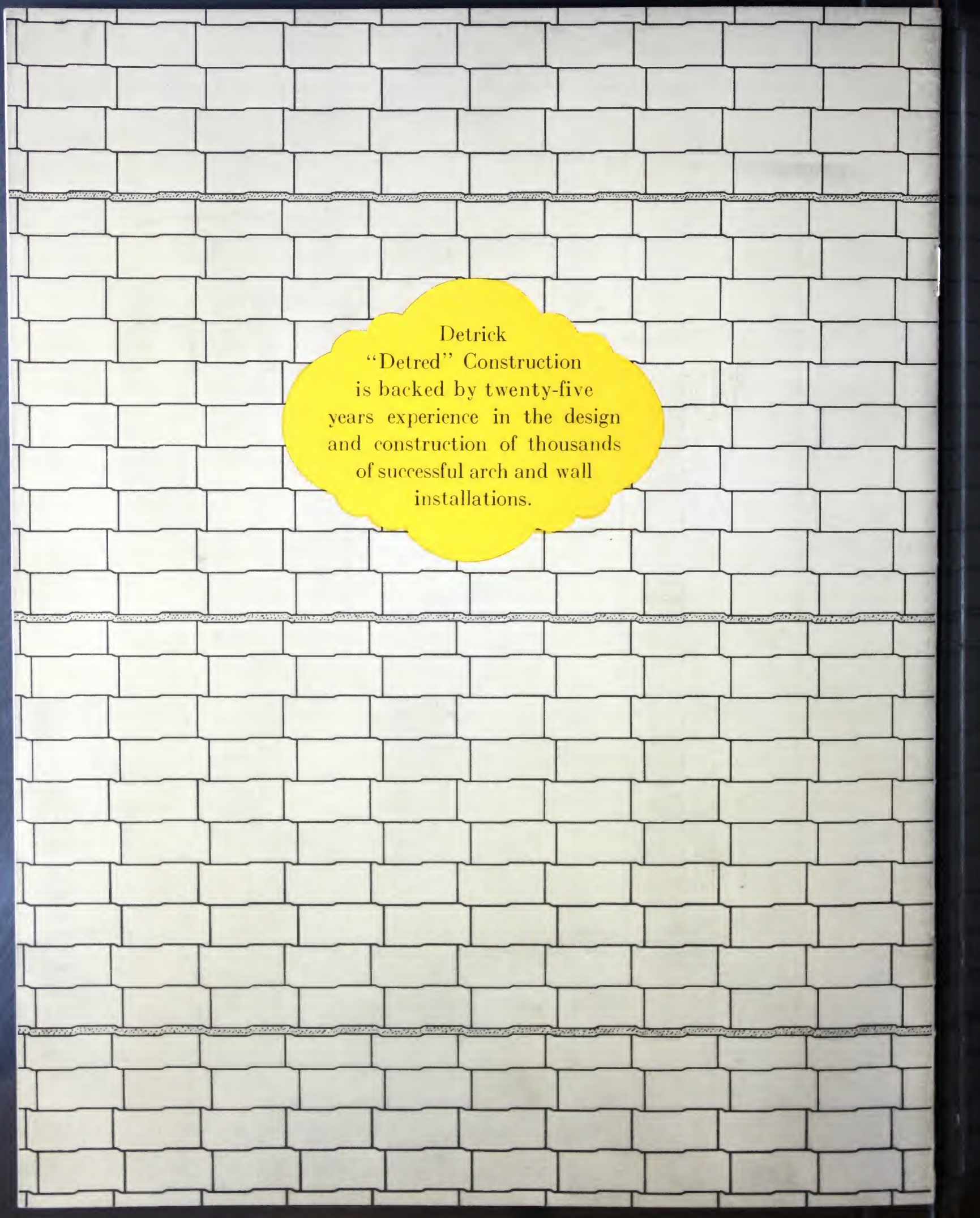
The standard thicknesses of the Detred Insulated Wall with 9" refractory are 12," 13 and 14" measured from the face of the steel column to the inside face of the tile. When Detrick casing is used as shown below 1" is added to these dimensions for the casing spacers and battens. Only two standard hangers, as shown, are required for the Detred Insulated Wall.

NOTE:  
All surrounding installed portions of plates are shown in their final position.



Method of Installing Detrick Casing





Detrick  
"Detred" Construction  
is backed by twenty-five  
years experience in the design  
and construction of thousands  
of successful arch and wall  
installations.